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EXAMINER	
COUGHLAN, PETER D	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/830,177	Applicant(s) WILSON, SCOTT B.	
	Examiner PETER COUGHLAN	Art Unit 2129	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _11 January 2008_.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-25,31,33,37-39 and 82-99_ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-25,31,33,37-39 and 82-99_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _4/21/2004_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Detailed Action

1. This office action is in response to an AMENDMENT entered January 11, 2008 for the patent application 10/830177 filed on April 21, 2004.

2. All previous office actions are fully incorporated into this Final Office Action by reference.

Status of Claims

3. Claims 1-25, 31, 33, 37-39, 82-99 are pending.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 2, 31, 33, 37, 39, 82, 85, 87-89, 93, 99 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Elias ('Personal computer system for ECG recognition in myocardial infarction diagnosing based on an artificial neural network'; referred to as **Elias)**, in view of Magnuson. (U. S. Patent Publication 20050236004, referred to as **Magnuson**) in view of Mehrotra ('Elements of Artificial Neural Networks', referred to as **Mehrotra**)

Claim 1

Elias teaches collecting at least one training cases in the medical instrument, wherein the training case has an input state indicative of at least a portion of a first biomedical signal of a particular patient and a corresponding output value indicative of a medical event of the particular patient. (**Elias,** abstract; 'Training cases' of applicant is equivalent to 'q, r, s, p, t, age and sex' measurements of patient.)

Elias does not teach reconfiguring a neural network stored in the medical instrument based on the at least one training case of a particular patient.

Magnuson teaches reconfiguring a neural network stored in the medical instrument based on the at least one training case of a particular patient. (**Magnuson,** ¶0044, ¶0035, Figure 8; 'Particular patient' of applicant is equivalent to 'individual specifically' of Magnuson. 'Reconfiguring a neural network' of applicant is equivalent to 'first principle model (FPM I)' on a 'non-linear model' of Magnuson.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Elias by having patient specific tools as taught by

Magnuson to reconfiguring a neural network stored in the medical instrument based on the at least one training case of a particular patient.

For the purpose of accounting the differences between patents for improved results.

Elias and Magnuson do not teach wherein reconfiguring the network comprises adding a node indicative of the at least one training case.

Mehrotra teaches wherein reconfiguring the network comprises adding a node indicative of the at least one training case. (**Mehrotra,** 133-135; 'Reconfiguring the network' of applicant is equivalent to 'the tiling algorithm' of Mehrotra.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the combined teachings of Elias and Magnuson by being able to reconfigure the neural network as taught by Mehrotra to have wherein reconfiguring the network comprises adding a node indicative of the at least one training case.

For the purpose of being able to train the neural network with a new case in which the previous configuration could not classify the input data.

Elias teaches receiving a second biomedical signal of the particular patient in the medical instrument (**Elias,** p1096, C2:3-16, Figure 2; In order to get 'results' the neural network must receive a second 'biomedical signal.'); applying the second biomedical signal to the generated neural network to generate an output of the neural network(**Elias,** p1096, C2:3-16, Figure 2; In order to get 'results' the neural network must be 'applied' with a second 'biomedical signal.'); and identifying a medical event of

the particular patient based the output of the neural network. (**Elias,** abstract; 'Identifying a medical event' of applicant is illustrated by each output nodes of the neural network. These nodes represent 'normal, left ventricular hypertrophy, right ventricular hypertrophy, biventricular hypertrophy, anterior myocardial infarction, inferior myocardial infarction.)

Elias does not teach outputting data indicative of the identified medical event of the particular patient.

Magnuson teaches outputting data indicative of the identified medical event of the particular patient. (**Magnuson,** ¶0044, ¶0035, ¶0004, Figure 8; 'Particular patient' of applicant is equivalent to 'individual specifically' of Magnuson. 'Identified medical event' of applicant is equivalent to 'detecting such things such as cancer or heart problems' of Magnuson.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Elias by outputting the results as taught by Magnuson to outputting data indicative of the identified medical event of the particular patient.

For the purpose of being able to see the results from the invention.

Claim 2

Elias teaches selecting a plurality of time epochs from a record of instrument feature values (**Elias,** abstract; 'Plurality of time epochs' of applicant is equivalent to time and amplitudes' of Elias.); and indicating an output value for each selected time

epoch. (**Elias,** abstract; ‘Indicating an output value’ of applicant is equivalent to the value of the ‘amplitude’ of Elias.)

Claim 31

Elias teaches applying the neural network in an electronic device to generate a first output value indicative of a classification a first input state (**Elias,** abstract, p1096, C1:23 through C2:2; ‘Classification a first input state’ of applicant is equivalent to ‘training’ of a neural network. The training data for the neural network are the p, q, r, s, t, st segment, age and sex of the patient.); detecting a first prediction error in the first output value (**Elias,** Figure 2; To use a back propagation neural network, an error needs to be detected between the projected output and the actual output of the neural network. This corresponds to the ‘first output value’ of applicant.); creating a first training case based on the first input state wherein the first training case corrects the first prediction error. (**Elias,** abstract, p1096, C1:23 through C2:2; ‘Training cases’ of applicant is equivalent to ‘q, r, s, p, t, age and sex’ measurements of patient. ‘Corrects’ is accomplished by using a ‘back propagation neural network’ of Elias.)

Elias does not teach reconfiguring the neural network to correctly classify the first training case without retraining the neural network wherein reconfiguring the detection module further comprises adding a first pattern layer node to the neural network based on the first training case.

Magnuson teaches reconfiguring the neural network to correctly classify the first training case without retraining the neural network wherein reconfiguring the detection

module further comprises adding a first pattern layer node to the neural network based on the first training case. (**Magnuson,** ¶0044, ¶0035, Figure 8; 'Particular patient' of applicant is equivalent to 'individual specifically' of Magnuson. 'Reconfiguring a neural network' of applicant is equivalent to 'first principle model (FPM I)' on a 'non-linear model' of Magnuson. 'Adding a first pattern layer' of applicant is equivalent to inserting one of the 'first pattern model (FPM i)' of Magnuson.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Elias by using a weights matrix as taught by Magnuson to reconfiguring the neural network to correctly classify the first training case without retraining the neural network wherein reconfiguring the detection module further comprises adding a first pattern layer node to the neural network based on the first training case.

For the purpose of avoiding retraining a neural network.

Elias teaches and applying the neural network to generate a second output value from the electronic device indicative of a classification of a second input state. (**Elias,** p1096, C2:3-16, Figure 2; In order to get 'results' the neural network must be 'applied' with a second 'input state.')

Elias does not teach outputting data indicative of the second output value.

Magnuson teaches outputting data indicative of the second output value. (**Magnuson,** ¶0004; 'Outputting data indicative of the second output value' of applicant is equivalent to 'detecting such things such as cancer or heart problems' of Magnuson.) It would have been obvious to a person having ordinary skill in the art at the time of

applicant's invention to modify the teachings of Elias by outputting a result as taught by Magnuson to outputting data indicative of the second output value.

For the purpose of receiving a patient specific diagnosis.

Claim 33

Elias teaches wherein the neural network is initially incapable of correctly classifying a first input state. (**Elias,** abstract, p1096, C1:23 through C2:2; When training a neural network (with first input state) it is obvious that it is incapable to classify due to the fact the neural network is in a training state and not a classifying state.)

Claim 37

Elias teaches applying a detection module to classify the first input state into a first event class (**Elias,** abstract, p1096 C1:23 through C2:16, p1095; 'Applying a detection module to classify the first input state into a first event class' means the training of the neural network for the first event or medical condition. This is equivalent to 'the training process' of Elias.); determining that the detection module incorrectly classified the first input state into the first event class (**Elias,** abstract, p1096 C1:23 through C2:16, p1095;' Determining that the detection module incorrectly classified the first input state into the first event class' is part of the back propagation process in which the difference between the incorrectly classification and the ideal classification is used to modify the weights of the neural network.); creating the first training case by

associating the first input state with a second event class (**Elias,** abstract, p1096 C1:23 through C2:16, p1095;.The ‘association’ of applicant is equivalent to the relationship between the real output of the node compared to the ideal output of the node.); and reconfiguring the detection module in real-time based on the first training case. (**Elias,** abstract, p1096 C1:23 through C2:16, p1095; ‘Reconfiguring’ of applicant is equivalent to the adjustment of the weights due to back propagation of the neural network. ‘Real time’ of applicant is equivalent to ‘real time to evaluate’ of Elias.)

Claim 39

Elias teaches wherein the first and second input states are indicative of a biomedical signal of at least one patient and wherein the first and second output values are indicative of a medical condition.(**Elias,** abstract; Both the training and the use of Elias pertain to myocardial infarction which is a medical condition.)

Claim 82

Elias teaches receiving a biomedical signal of a particular patient (**Elias,** abstract, p1096, C1:23 through C2:2; ‘Receiving a biomedical signal’ of applicant is equivalent to ‘q, r, s, p, t, age and sex’ measurements of the patient of Elias.); identifying a portion of the signal that is indicative of a medical event of the particular patient based on user input. (**Elias,** abstract, p1096, C1:23 through C2:2; ‘Identifying a portion’ of applicant are given by the examples ‘q, r, s, p, t, age and sex’ measurements of the patient of Elias.)

Elias does not teach reconfiguring a predictive model stored in a memory of an electronic device for identifying a subsequent medical event of the particular patient based on an additional biomedical signal of the patient and; storing the reconfigured predictive model in the memory of the electronic device.

Magnuson teaches reconfiguring a predictive model stored in a memory of an electronic device for identifying a subsequent medical event of the particular patient based on an additional biomedical signal of the patient. (**Magnuson,** ¶0044, ¶0035, ¶0004, Figure 8; ‘Particular patient’ of applicant is equivalent to ‘individual specifically’ of Magnuson. ‘Reconfiguring a neural network’ of applicant is equivalent to ‘first principle model (FPM i)’ on a ‘non-linear model’ of Magnuson. ‘Particular patient’ of applicant s equivalent to ‘individual specifically’ of Magnuson. ‘Identified medical event’ of applicant is equivalent to ‘detecting such things such as cancer or heart problems’ of Magnuson.)

Elias and Magnuson do not teach wherein reconfiguring the network comprises adding a node indicative of the at least one training case.

Mehrotra teaches wherein reconfiguring the network comprises adding a node indicative of the at least one training case. (**Mehrotra,** 133-135; ‘Reconfiguring the network’ of applicant is equivalent to ‘the tiling algorithm’ of Mehrotra.) It would have been obvious to a person having ordinary skill in the art at the time of applicant’s invention to modify the combined teachings of Elias and Magnuson by being able to reconfigure the neural network as taught by Mehrotra to have wherein reconfiguring the network comprises adding a node indicative of the at least one training case.

For the purpose of being able to train the neural network with a new case in which the previous configuration could not classify the input data.

Elias does not teach storing the reconfigured predictive model in the memory of the electronic device.

Magnuson teaches storing the reconfigured predictive model in the memory of the electronic device. (**Magnuson,** ¶0044, ¶0035, Figure 8; The storage of the predictive model in memory' of applicant is lustrated by each 'first principle model (FPM i)' on a 'non-linear model' of Magnuson.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Elias by being able to reconfigure a neural network as taught by Magnuson to have reconfiguring a predictive model stored in a memory of an electronic device for identifying a subsequent medical event of the particular patient based on an additional biomedical signal of the patient and; storing the reconfigured predictive model in the memory of the electronic device.

For the purpose of obtaining increased diagnoses due to the fact the neural network is patient specific.

Claim 85

Elias teaches wherein generating the predictive model comprises reconfiguring a neural network. (**Elias,** abstract, Elias discloses the use of an artificial neural network for patient specific purposes. Therefore the network must be trained for said specific person.)

Claim 87

Elias teaches wherein identifying the portion of the signal comprises identifying an instrument feature of the signal. (**Elias,** abstract, p1096, C1:23 through C2:2; Examples of ‘feature of the signal’ of applicant are disclosed by the ‘q, r, s, p, t’ waves of the patient ECG measurements of patient.)

Claim 88

Elias teaches applying a second biomedical signal of the patient to the reconfigured model to generate an output of the model (**Elias,** abstract, Figure 2, p1096, C1:23 through C2:2; The second biomedical signal of applicant is equivalent to the ECG signal of Elias. ‘Applying’ the signal is simply inserting the information into the neural network.); and identifying the medical event of the patient based on the output of the model. (**Elias,** abstract, ‘Identifying a condition’, of applicant is illustrated by each output nodes of the neural network. These nodes represent ‘normal, left ventricular hypertrophy, right ventricular hypertrophy, biventricular hypertrophy, anterior myocardial infarction, inferior myocardial infarction.)

Claim 89

Elias teaches a memory configured to store a neural network and at least one training case, wherein the training case has an input state indicative of at least a portion of a first biomedical signal of a particular patient and a corresponding output

value indicative of a medical event of the particular patient. (**Elias,** figure 2, abstract; 'Memory configured to store' of applicant is equivalent to the weights in each node of the neural network. The 'first biomedical signal' of applicant is equivalent to the 'signal pre-processing' of Elias. 'Medical event' of applicant is equivalent to 'myocardial infarction' of Elias.)

Elias does not teach a processor configured to: reconfigure the stored neural network based on the at least one training case of a particular patient; receive a second biomedical signal of the particular patient; apply the second biomedical signal to the reconfigured neural network to generate an output of the neural network.

Magnuson teaches a processor configured to: reconfigure the stored neural network based on the at least one training case of a particular patient; receive a second biomedical signal of the particular patient. (**Magnuson,** ¶0044, ¶0035, Figure 8; 'Particular patient' of applicant is equivalent to 'individual specifically' of Magnuson. 'Reconfiguring a neural network' of applicant is equivalent to 'first principle model (FPM i)' on a 'non-linear model' of Magnuson.)

Elias and Magnuson do not teach wherein reconfiguring the network comprises adding a node indicative of the at least one training case.

Mehrotra teaches wherein reconfiguring the network comprises adding a node indicative of the at least one training case. (**Mehrotra,** 133-135; 'Reconfiguring the network' of applicant is equivalent to 'the tiling algorithm' of Mehrotra.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the combined teachings of Elias and Magnuson by being able to

reconfigure the neural network as taught by Mehrotra to have wherein reconfiguring the network comprises adding a node indicative of the at least one training case.

For the purpose of being able to train the neural network with a new case in which the previous configuration could not classify the input data.

Elias does not teach apply the second biomedical signal to the reconfigured neural network to generate an output of the neural network.

Magnuson teaches apply the second biomedical signal to the reconfigured neural network to generate an output of the neural network. (**Magnuson,** ¶0044, ¶0035, Figure 8; 'Apply the second biomedical signal' of applicant is equivalent to applying a different 'first principle model (FPM i)' on a 'non-linear model' of Magnuson.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Elias by being able to reconfigure a neural to a patient specific format as taught by Magnuson to have a processor configured to: reconfigure the stored neural network based on the at least one training case of a particular patient; receive a second biomedical signal of the particular patient; apply the second biomedical signal to the reconfigured neural network to generate an output of the neural network.

For the purpose of avoiding retraining a neural network to a specific patient.

Elias teaches identify a medical event of the particular patient based the output of the neural network. (**Elias,** p1096, C2:3-16, Figure 2, abstract; 'Output' of applicant

occurs at the ‘output layer’ of the neural network. Each node represents a medical event corresponding to myocardial infarction.)

Elias does not teach an output device configured to output data indicative of the identified medical event of the particular patient.

Magnuson teaches an output device configured to output data indicative of the identified medical event of the particular patient. (**Magnuson,** ¶0044, ¶0004; ‘Particular patient’ of applicant is equivalent to ‘individual specifically’ of Magnuson. ‘Identified medical event’ of applicant is equivalent to ‘detecting such things such as cancer or heart problems’ of Magnuson.) It would have been obvious to a person having ordinary skill in the art at the time of applicant’s invention to modify the teachings of Elias by outputting results as taught by Magnuson to have an output device configured to output data indicative of the identified medical event of the particular patient.

For the purpose of getting the results of the inventions computations.

Claim 93

Elias teaches means for storing a neural network and at least one training case, wherein the training case has an input state indicative of at least a portion of a first biomedical signal of a particular patient and a corresponding output value indicative of a medical event of the particular patient. (**Elias,** figure 2, abstract; ‘Means for storing a neural network’ of applicant is equivalent to the weights in each node of the neural network. ‘Training case has an input state indicative of at least a portion of a first

biomedical signal' of applicant is illustrated by the use of a back propagation neural network of Elias. The 'first biomedical signal' of applicant is equivalent to the 'signal pre-processing' of Elias. 'Medical condition' of applicant is equivalent to 'myocardial infarction' of Elias.)

Elias and Magnuson do not teach wherein reconfiguring the network comprises adding a node indicative of the at least one training case.

Mehrotra teaches wherein reconfiguring the network comprises adding a node indicative of the at least one training case. (**Mehrotra,** 133-135; 'Reconfiguring the network' of applicant is equivalent to 'the tiling algorithm' of Mehrotra.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the combined teachings of Elias and Magnuson by being able to reconfigure the neural network as taught by Mehrotra to have wherein reconfiguring the network comprises adding a node indicative of the at least one training case.

For the purpose of being able to train the neural network with a new case in which the previous configuration could not classify the input data.

Elias does not teach means for processing, said processing means configured to: reconfigure the stored neural network based on at least one training case of a particular patient; and receive a second biomedical signal of the particular patient; apply the second biomedical signal to the generated neural network to generate an output of the neural network.

Magnuson teaches means for processing, said processing means configured to: reconfigure the stored neural network based on at least one training case of a particular patient (**Magnuson,** ¶0044, ¶0035, Figure 8; ‘Particular patient’ of applicant is equivalent to ‘individual specifically’ of Magnuson. ‘Reconfiguring a neural network’ of applicant is equivalent to ‘first principle model (FPM i)’ on a ‘non-linear model’ of Magnuson.); and receive a second biomedical signal of the particular patient (**Magnuson,** ¶0044, ¶0035, Figure 8; ‘Receive a second biomedical signal’ of applicant is equivalent to ‘intestinal discomfort’ of Magnuson (the first would be migraine headache).); apply the second biomedical signal to the generated neural network to generate an output of the neural network. (**Magnuson,** ¶0044, ¶0035, Figure 8; ‘Apply the second biomedical signal’ of applicant is equivalent to applying a different ‘first principle model (FPM i)’ on a ‘non-linear model’ of Magnuson.) It would have been obvious to a person having ordinary skill in the art at the time of applicant’s invention to modify the teachings of Elias by being able to reconfigure a neural network as taught by Magnuson to have means for processing, said processing means configured to: reconfigure the stored neural network based on at least one training case of a particular patient; and receive a second biomedical signal of the particular patient; apply the second biomedical signal to the generated neural network to generate an output of the neural network.

For the purpose of avoiding the cost of retraining a neural network.

Elias teaches identify a medical event of the particular patient based the output of the neural network. (**Elias,** p1096, C2:3-16, Figure 2, abstract; ‘Output’ of applicant

occurs at the 'output layer' of the neural network. Each node represents a medical event corresponding to myocardial infarction.)

Elias does not teach means for outputting data indicative of the identified medical event of the particular patient.

Magnuson teaches means for outputting data indicative of the identified medical event of the particular patient. (**Magnuson,** ¶0044, ¶0004; 'Particular patient' of applicant s equivalent to 'individual specifically' of Magnuson. 'Identified medical event' of applicant is equivalent to 'detecting such things such as cancer or heart problems' of Magnuson.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Elias by outputting the results as taught by Magnuson to have means for outputting data indicative of the identified medical event of the particular patient.

For the purpose of linking a medical event to inputted data.

Claim 99

Elias teaches collecting at least one training case in a medical instrument, wherein the training case has an input state indicative of at least a portion of a first biomedical signal of a particular patient and a corresponding output value indicative of a medical event of the particular patient. (**Elias,** figure 2, abstract; 'Means for storing a neural network' of applicant is equivalent to the weights in each node of the neural network. 'Training case has an input state indicative of at least a portion of a first biomedical signal' of applicant is illustrated by the use of a back propagation neural

network of Elias. The ‘first biomedical signal’ of applicant is equivalent to the ‘signal pre-processing’ of Elias. ‘Medical condition’ of applicant is equivalent to ‘myocardial infarction’ of Elias.)

Elias does not teach reconfiguring a neural network stored in the medical instrument based on the at least one training case of the particular patient; receiving a second biomedical signal of the particular patient in the medical instrument; applying the second biomedical signal to the generated neural network to generate an output of the neural network.

Magnuson teaches reconfiguring a neural network stored in the medical instrument based on the at least one training case of the particular patient. (**Magnuson,** ¶0044, ¶0035, Figure 8; ‘Particular patient’ of applicant is equivalent to ‘individual specifically’ of Magnuson. ‘Reconfiguring a neural network’ of applicant is equivalent to ‘first principle model (FPM i)’ on a ‘non-linear model’ of Magnuson.)

Elias and Magnuson do not teach wherein reconfiguring the network comprises adding a node indicative of the at least one training case.

Mehrotra teaches wherein reconfiguring the network comprises adding a node indicative of the at least one training case. (**Mehrotra,** 133-135; ‘Reconfiguring the network’ of applicant is equivalent to ‘the tiling algorithm’ of Mehrotra.) It would have been obvious to a person having ordinary skill in the art at the time of applicant’s invention to modify the combined teachings of Elias and Magnuson by being able to reconfigure the neural network as taught by Mehrotra to have wherein reconfiguring the network comprises adding a node indicative of the at least one training case.

For the purpose of being able to train the neural network with a new case in which the previous configuration could not classify the input data.

Elias does not teach receiving a second biomedical signal of the particular patient in the medical instrument; applying the second biomedical signal to the generated neural network to generate an output of the neural network.

Magnuson teaches receiving a second biomedical signal of the particular patient in the medical instrument (**Magnuson,** ¶0044, ¶0035, Figure 8; ‘Receive a second biomedical signal’ of applicant is equivalent to ‘intestinal discomfort’ of Magnuson (the first would be migraine headache).); applying the second biomedical signal to the generated neural network to generate an output of the neural network. (**Magnuson,** ¶0044, ¶0035, Figure 8; ‘Apply the second biomedical signal’ of applicant is equivalent to applying a different ‘first principle model (FPM i)’ on a ‘non-linear model’ of Magnuson.) It would have been obvious to a person having ordinary skill in the art at the time of applicant’s invention to modify the teachings of Elias by being able to reconfigure a neural network as taught by Magnuson to have reconfiguring a neural network stored in the medical instrument based on the at least one training case of the particular patient; receiving a second biomedical signal of the particular patient in the medical instrument; applying the second biomedical signal to the generated neural network to generate an output of the neural network.

For the purpose of avoiding the costs or retraining a neural network.

Elias teaches identifying a medical event of the particular patient based the output of the neural network. (**Elias,** abstract; ‘Identifying a medical event’ of applicant

is illustrated by each output nodes of the neural network. These nodes represent 'normal, left ventricular hypertrophy, right ventricular hypertrophy, biventricular hypertrophy, anterior myocardial infarction, inferior myocardial infarction.)

Elias does not teach outputting data indicative of the identified medical event of the particular patient.

Magnuson teaches outputting data indicative of the identified medical event of the particular patient. (**Magnuson,** ¶0044, ¶0004; 'Particular patient' of applicant s equivalent to 'individual specifically' of Magnuson. 'Identified medical event' of applicant is equivalent to 'detecting such things such as cancer or heart problems' of Magnuson.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Elias by producing an output as taught by Magnuson to have outputting data indicative of the identified medical event of the particular patient.

For the purpose of having the invention correlate a medical event to inputted data.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the

> subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 38, 83, 84, 86, 90-92, 94-98 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Elias, Magnuson and Mehrotra as set forth above, in view of Jordan. (U. S. Patent Publication 20040077967, referred to as **Jordan**)

Claims 38, 92, 96

Elias, Magnuson and Mehrotra do not teach wherein the output device comprises a display.

Jordan teaches wherein the output device comprises a display. (**Jordan,** abstract; ‘Display’ of applicant is equivalent to ‘display device’ of Jordan.) It would have been obvious to a person having ordinary skill in the art at the time of applicant’s invention to modify the teachings of Elias, Magnuson and Mehrotra by using a display as an output device as taught by Jordan to have wherein the output device comprises a display.

For the purpose of viewing the results.

Claims 83, 90, 94, 97

Elias, Magnuson and Mehrotra do not teach wherein the biomedical signal comprises an electroencephalogram.

Jordan teaches wherein the biomedical signal comprises an electro-encephalogram. (**Jordan,** ¶0001, ¶0011, ¶0013) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Elias, Magnuson and Mehrotra by using brain waves as taught by Jordan to have wherein the biomedical signal comprises an electroencephalogram.

For the purpose of either establishing a baseline reading or reading a current reading compared to a base line reading to detect differences brain damage.

Claims 84, 91, 95, 98

Elias, Magnuson and Mehrotra do not teach wherein the medical event of the patient comprises a seizure.

Jordan teaches wherein the medical event of the patient comprises a seizure. (**Jordan,** ¶0001, ¶0011, ¶0013) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Elias, Magnuson and Mehrotra by looking for seizure characteristics as taught by Jordan to wherein the medical condition of the patient comprises a seizure.

For the purpose of determining or ruling out the condition of seizures.

Claim 86

Elias, Magnuson and Mehrotra do not teach at least partially displaying the signal; and displaying at least one user control for selecting the identified portion of the signal.

Jordan teaches displaying at least one user control for selecting the identified portion of the signal. (**Jordan,** ¶0012) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the combined teachings of Elias, Magnuson and Mehrotra by outputting part of the signal as taught by Jordan to have at least partially displaying the signal; and displaying at least one user control for selecting the identified portion of the signal.

For the purpose of allowing the user to see the actual signal which is used for input for verification.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 3-6, 8-10, 13, 14, 17, 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Elias, Magnuson and Mehrotra as set forth above, in view of Katz. (U. S. Patent 5943661, referred to as **Katz**)

Claim 3

Elias, Magnuson and Mehrotra do not teach selecting a configuration of instrument features; and wherein the constructing the neural network based on the training cases comprises: defining the neural network topology based on the input values and output values of the plurality of training cases; and determining a kernel width value.

Katz teaches selecting a configuration of instrument features; and wherein the constructing the neural network based on the training cases comprises (**Katz,** C3:45-61; ‘Instrument features’ of applicant is equivalent to selected data points’ of Katz.): defining the neural network topology based on the input values and output values of the plurality of training cases (**Katz,** C2:66 through C3:2; Defining the ‘topology’ of the neural network of applicant is equivalent to ‘transformation into the neural network’ of Katz.); and determining a kernel width value. (**Katz,** C3:62 through C4:7; ‘Determination of the kernel width is performed by the kernel function of Katz.) It would have been obvious to a person having ordinary skill in the art at the time of applicant’s invention to modify the teachings of Elias, Magnuson and Mehrotra by using a neural network as taught by Katz to selecting a configuration of instrument features; and wherein the constructing the neural network based on the training cases comprises: defining the neural network topology based on the input values and output values of the plurality of training cases; and determining a kernel width value.

For the purpose of taking advantage of the neural network excellent property of classification.

Claim 4

Elias, Magnuson and Mehrotra do not teach training the neural network includes determining an optimal kernel width value by minimizing prediction error of the neural network.

Katz teaches training the neural network includes determining an optimal kernel width value by minimizing prediction error of the neural network. (**Katz,** C4:18-22; Applicant uses Parzen's method for population density and Katz uses Parzen's method for determining population density.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Elias, Magnuson and Mehrotra by finding the optimal kernel value as taught by Katz to train the neural network includes determining an optimal kernel width value by minimizing prediction error of the neural network.

For the purpose of finding population density.

Claim 5

Elias, Magnuson and Mehrotra do not teach determining an optimal input feature kernel width value for each input feature based on the determined optimal kernel width value.

Katz teaches determining an optimal input feature kernel width value for each input feature based on the determined optimal kernel width value. (**Katz,** C4:18-22; The function of Katz is the function of 'x' with respect to sigma. Sigma is based on Sigma.) It

would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Elias, Magnuson and Mehrotra by finding the optimal input value for the kernel as taught by Katz to determine an optimal input feature kernel width value for each input feature based on the determined optimal kernel width value.

For the purpose of using this value to use for finding the kernel width.

Claim 6

Elias, Magnuson and Mehrotra do not teach the neural network is a probabilistic neural network.

Katz teaches the neural network is a probabilistic neural network. (**Katz,** C2:12-23) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Elias, Magnuson and Mehrotra by using a probabilistic neural network design as taught by Katz to have the neural network is a probabilistic neural network.

For the purpose of determining an answer with a probability of accuracy associated with it.

Claim 8

Elias, Magnuson and Mehrotra do not teach determining the kernel width value is based on a population statistic of the plurality of training cases.

Katz teaches determining the kernel width value is based on a population statistic of the plurality of training cases. (**Katz,** C4:18-22; Katz illustrates as population grows, kernel width decreases, thus it is based upon population statistics.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Elias, Magnuson and Mehrotra by finding the kernel width as taught by Katz to determine the kernel width value is based on a population statistic of the plurality of training cases.

For the purpose of find the kernel width based on population statistic or population density.

Claim 9

Elias, Magnuson and Mehrotra do not teach determining the kernel width value is based at least in part on the mathematical term of the number of training cases raised to an exponent power of about negative one-fifth.

Katz teaches determining the kernel width value is based at least in part on the mathematical term of the number of training cases raised to an exponent power of about negative one-fifth. (**Katz,** C3:62 through C4:22; 'About negative 1/5' is close enough to 'negative ½' of Katz.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Elias, Magnuson and Mehrotra by using training cases in the denominator as a root n root function as taught by Katz to the kernel width value is based at least in part on the

mathematical term of the number of training cases raised to an exponent power of about negative one-fifth.

For the purpose of allowing the width to grow exponentially based of training cases

Claim 10

Elias, Magnuson and Mehrotra do not teach determining the kernel width value is based on the population distribution of the plurality of training cases.

Katz teaches determining the kernel width value is based on the population distribution of the plurality of training cases. (**Katz,** C4:18-22; Katz illustrates as population grows, kernel width decreases, thus it is based upon population statistics. This would be the same in a functioning neural network as it would be in a training neural network.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Elias, Magnuson and Mehrotra by determining kernel width as taught by Katz to have the kernel width value is based on the population distribution of the plurality of training cases.

For the purpose of using population distribution or population density as a basis of finding the kernel width.

Claim 13

Elias, Magnuson and Mehrotra do not teach normalizing the input values of the plurality of training cases based on the standard deviation for each input feature.

Katz teaches normalizing the input values of the plurality of training cases based on the standard deviation for each input feature. (**Katz,** C4:18-22; The 'standard deviation' of each input node can be used to normalize the training data of applicant is illustrated by the generation of the value of sigma which is one standard deviation of Katz.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the teachings of Elias, Magnuson and Mehrotra by using standard deviation as a base for normalizing input values as taught by Katz to normalize the input values of the plurality of training cases based on the standard deviation for each input feature.

For the purpose of using the Gaussian distribution as a bases for input values.

Claim 14

Elias, Magnuson and Mehrotra do not teach determining a plurality of partitions based on the pattern layer nodes of the neural network wherein each partition comprises a plurality of groups of pattern layer nodes; selecting one of the plurality of partitions based on a partition metric; and for each group of pattern layer nodes within the selected partition: replacing the group of pattern layer nodes with a compressed pattern layer node; and adjusting the link weights between the compressed pattern layer node and any summation layer nodes to reflect the number of replaced pattern layer nodes.

Katz teaches determining a plurality of partitions based on the pattern layer nodes of the neural network wherein each partition comprises a plurality of groups of pattern layer nodes (**Katz,** C1:41-58; ‘Determining a plurality of partitions’ of applicant is equivalent to ‘classification’ of Katz.); selecting one of the plurality of partitions based on a partition metric (**Katz,** C8:42-61; ‘Partition metric’ of applicant is equivalent to ‘weights’ of Katz.); and for each group of pattern layer nodes within the selected partition (**Katz,** Fig. 4; Katz illustrates that a group of nodes in layer ‘L’ corresponds to a node in layer ‘M’. This group on nodes in layer ‘L’ is equivalent to a ‘group of pattern layer nodes’ of applicant.): replacing the group of pattern layer nodes with a compressed pattern layer node (**Katz,** C2:66 through C3:2; ‘Compressed pattern layer node’ of applicant is accomplished by ‘data compression scheme’ of Katz.); and adjusting the link weights between the compressed pattern layer node and any summation layer nodes to reflect the number of replaced pattern layer nodes. (**Katz,** C2:12-23; By training, weights are adjusted so that output nodes reflect input pattern layer nodes.) It would have been obvious to a person having ordinary skill in the art at the time of applicant’s invention to modify the teachings of Elias, Magnuson and Mehrotra by finding partitions for the neural network as taught by Katz to determine a plurality of partitions based on the pattern layer nodes of the neural network wherein each partition comprises a plurality of groups of pattern layer nodes; selecting one of the plurality of partitions based on a partition metric; and for each group of pattern layer nodes within the selected partition; replacing the group of pattern layer nodes with a compressed pattern layer node; and

adjusting the link weights between the compressed pattern layer node and any summation layer nodes to reflect the number of replaced pattern layer nodes.

For the purpose of aiding in the accuracy of the neural network.

Claim 17

Elias, Magnuson and Mehrotra do not teach the partition metric comprises determining an error value for each partition.

Katz teaches the partition metric comprises determining an error value for each partition. (**Katz,** C9:23 through C10:12; ‘Error value’ of applicant is equivalent to ‘error bars’ of Katz.) It would have been obvious to a person having ordinary skill in the art at the time of applicant’s invention to modify the teachings of Elias, Magnuson and Mehrotra by finding the error value for each partition as taught by Katz to have the partition metric comprises determining an error value for each partition.

For the purpose of generating an accuracy level with every classification result.

Claim 18

Elias, Magnuson and Mehrotra do not teach the partition metric comprises determining a compression ratio for each partition.

Katz teaches the partition metric comprises determining a compression ratio for each partition. (**Katz,** C2:44-56; ‘Compression ratio’ of applicant is equivalent to ‘compression procedures’ of Katz.) It would have been obvious to a person having ordinary skill in the art at the time of applicant’s invention to modify the teachings of

Elias, Magnuson and Mehrotra by teaching within each partition, determine the compression ration as taught by Katz to have the partition metric comprises determining a compression ratio for each partition.

For the purpose of in an attempt to balance the compression versus loss of accuracy.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Elias, Magnuson, Mehrotra and Katz as set forth above, in view of Wasserman. (U. S. Patent 5559929, referred to as **Wasserman**)

Claim 7

Elias, Magnuson, Mehrotra and Katz do not teach the neural network is a generalized regression neural network.

Wasserman teaches the neural network is a generalized regression neural network. (**Wasserman,** C9:60 through C10:3) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the combined teachings of Elias, Magnuson, Mehrotra and Katz by using a regression neural network as taught by Wasserman to have the neural network to be a generalized regression neural network.

For the purpose of allowing training on new data without requiring previous data to be available.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 11, 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Elias, Magnuson, Mehrotra and Katz as set forth above, in view of Oriol. (U. S. Patent Publication 20010014776, referred to as **Oriol**)

Claim 11

Elias, Magnuson, Mehrotra and Katz do not teach the population distribution of the plurality of training cases is approximately Normal.

Oriol teaches the population distribution of the plurality of training cases is approximately Normal. (**Oriol,** ¶0086; ‘Normal population distribution’ of applicant is equivalent to ‘Gaussian windows’ of Oriol.) It would have been obvious to a person having ordinary skill in the art at the time of applicant’s invention to modify the combined teachings of Elias, Magnuson, Mehrotra and Katz by using normal distributions as taught by Oriol to have the population distribution of the plurality of training cases that is approximately Normal.

For the purpose of approximating sigma in a standard distribution.

Claim 12

Elias, Magnuson and Mehrotra does not teach normalizing the input values of the plurality of training cases based on the standard deviation for each input feature.

Katz teaches normalizing the input values of the plurality of training cases based on the standard deviation for each input feature. (**Katz,** C4:18-22; The ‘standard deviation’ of each input node can be used to normalize the training data of applicant is illustrated by the generation of the value of sigma which is one standard deviation of Katz.)

Elias, Magnuson, Mehrotra and Katz do not teach the step of determining the kernel width value comprises defining the kernel width value to be a number in the range 0.1 to 1.0.

Oriol teaches the step of determining the kernel width value comprises defining the kernel width value to be a number in the range 0.1 to 1.0. (**Oriol,** ¶0006; ‘Kernel width value’ of applicant is equivalent to ‘range’ of Oriol.) It would have been obvious to a person having ordinary skill in the art at the time of applicant’s invention to modify the combined teachings of Elias, Magnuson, Mehrotra and Katz by using sigma as taught by Oriol to have normalizing the input values of the plurality of training cases based on the standard deviation for each input feature, and wherein determining the kernel width value comprises defining the kernel width value to be a number in the range 0.1 to 1.0.

For the purpose of using the same scale for all input parameters thus balancing variables from different domains.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 15, 16, 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Elias, Magnuson, Mehrotra and Katz as set forth above, in view of Straforini. (U. S. Patent 6092059, referred to as **Straforini**)

Claim 15

Elias, Magnuson, Mehrotra and Katz do not teach the partition metric comprises determining a BIC value for each partition.

Straforini teaches the partition metric comprises determining a BIC value for each partition. (**Straforini,** C17:23-35; ‘BIC value’ of applicant is equivalent to ‘bayes based configuration’ of Straforini.) It would have been obvious to a person having ordinary skill in the art at the time of applicant’s invention to modify the combined teachings of Elias, Magnuson, Mehrotra and Katz by using a BIC value as taught by Straforini to have the partition metric comprises determining a BIC value for each partition.

For the purpose of using Bayesian Information Criterion is used to determine which instrument configuration is the most optimal.

Claim 16

Elias, Magnuson, Mehrotra and Katz do not teach the partition metric comprises selecting the maximum BIC value.

Straforini teaches the partition metric comprises selecting the maximum BIC value. (**Straforini,** C17:64 through C18:15; ‘Maximum BIC value’ of applicant is equivalent to ‘first feature in the list is that with the highest rank’ of Straforini.) It would

have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the combined teachings of Elias, Magnuson, Mehrotra and Katz by choosing the maximum as taught by Straforini to have the partition metric comprised by selecting the maximum BIC value.

For the purpose of selecting the best configuration.

Claim 20

Elias, Magnuson, Mehrotra and Katz do not teach the partition metric comprises determining a BIC value.

Straforini teaches the partition metric comprises determining a BIC value. (**Straforini,** C17:23-35; 'BIC value' of applicant is equivalent to 'bayes based configuration' of Straforini.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the combined teachings of Elias, Magnuson, Mehrotra and Katz by using the BIC value as taught by Straforini to have the partition metric comprised by determining a BIC value.

For the purpose of using Bayesian Information Criterion is used to determine which instrument configuration is the most optimal.

Elias, Magnuson and Mehrotra do not teach an error value, and a compression ratio value for each partition.

Katz teaches an error value (**Katz,** C9:23 through C10:12; 'Error value' of applicant is equivalent to 'error bars' of Katz.), and a compression ratio value for each partition. (**Katz,** C2:44-56; 'Compression ratio' of applicant is equivalent to 'compression

procedures' of Katz.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the combined teachings of Elias, Magnuson and Mehrotra by disclosing an error value and a compression ration as taught by Katz to have an error value, and a compression ratio value for each partition.

For the purpose of generating values from partition metric for use in clustering methods.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Elias, Magnuson, Mehrotra and Katz as set forth above in view of Huo. (U. S. Patent 6282305, referred to as **Huo**)

Claim 19

Elias, Magnuson, Mehrotra and Katz do not teach the partition metric comprises determining a Minimum Description Length for each partition.

Huo teaches the partition metric comprises determining a Minimum Description Length for each partition. (**Huo,** C20:53-64; ‘Minimum Description Length’ of applicant is equivalent to ‘minimum squared difference’ of Huo.) It would have been obvious to a person having ordinary skill in the art at the time of applicant’s invention to modify the teachings of Elias, Magnuson, Mehrotra and Katz by finding the minimum length needed as taught by Huo to the partition metric comprises determining a Minimum Description Length for each partition.

For the purpose of finding the smallest portion needed for accurate results in lower percentage of extreme input measurements.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 21, 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Elias, Magnuson, Mehrotra, Katz and Straforini as set forth above, in view of Vaithyanathan. (U. S. Patent 5857179, referred to as **Vaithyanathan**)

Claim 21

Elias, Magnuson, Mehrotra, Katz and Straforini do not teach the K-means clustering method is applied to determine a plurality of partitions.

Vaithyanathan teaches the K-means clustering method is applied to determine a plurality of partitions. (**Vaithyanathan,** C2:66 through C3:9) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the combined teachings of Elias, Magnuson, Mehrotra, Katz and Straforini by using k-means as taught by Vaithyanathan to have the K-means clustering method is applied to determine a plurality of partitions.

For the purpose of using an industry standard method of clustering data.

Claim 22

Elias, Magnuson, Mehrotra, Katz and Straforini the hierarchical clustering method is used to determine the plurality of partitions.

Vaithyanathan teaches the hierarchical clustering method is used to determine the plurality of partitions. (**Vaithyanathan,** C8:12-23) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the combined teachings of Elias, Magnuson, Mehrotra, Katz and Straforini by using

hierarchical clustering as taught by Vaithyanathan to have the hierarchical clustering method that is used to determine the plurality of partitions.

For the purpose of using an industry standard method of clustering data.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 24, 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Elias, Magnuson, Mehrotra and Katz as set forth above, in view of Vaithyanathan. (U. S. Patent 5857179, referred to as **Vaithyanathan**)

Claim 24

Elias, Magnuson, Mehrotra and Katz do not teach selecting one of the determined plurality of partitions based on a partition metric comprises: determining, for each partition within the determined plurality of partitions, a centroid value for each group of pattern layer nodes within that partition.

Vaithyanathan teaches selecting one of the determined plurality of partitions based on a partition metric comprises: determining, for each partition within the determined plurality of partitions, a centroid value for each group of pattern layer nodes within that partition. (**Vaithyanathan,** C10:22-42) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the combined teachings of Elias, Magnuson, Mehrotra and Katz by find the centroid value as taught by Vaithyanathan to select one of the determined plurality of partitions based on a partition metric comprises: determining, for each partition within the determined plurality of partitions, a centroid value for each group of pattern layer nodes within that partition.

For the purpose is so similar patterns can be merged and described by their centroid and weight.

Claim 25

Elias, Magnuson, Mehrotra and Katz do not teach selecting one of the determined plurality of partitions based on a partition metric further comprises: determining, for each partition within the determined plurality of partitions, a covariance value for each group of pattern layer nodes within that partition.

Vaithyanathan teaches selecting one of the determined plurality of partitions based on a partition metric further comprises: determining, for each partition within the determined plurality of partitions, a covariance value for each group of pattern layer nodes within that partition. (**Vaithyanathan,** C6:50-67) It would have been obvious to a

person having ordinary skill in the art at the time of applicant's invention to modify the combined teachings of Elias, Magnuson, Mehrotra and Katz by finding the covariance value as taught by Vaithyanathan to select one of the determined plurality of partitions based on a partition metric further comprises: determining, for each partition within the determined plurality of partitions, a covariance value for each group of pattern layer nodes within that partition.

For the purpose of using an improved compression method may be employed wherein each pattern is described by its centroid, weight and covariance matrix.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Elias, Magnuson, Mehrotra, Katz, Straforini and Vaithyanathan as set forth above, in view of Banavar. (U. S. Patent 6336119, referred to as **Banavar**)

Claim 23

Elias, Magnuson, Mehrotra, Katz, Straforini and Vaithyanathan do not teach the step of determining a plurality of partitions comprises applying the hierarchical clustering method to create partitions containing between about 1 and about 20 groups.

Banavar teaches the step of determining a plurality of partitions comprises applying the hierarchical clustering method to create partitions containing between about 1 and about 20 groups.(**Banavar,** abstract; 'Between about 1 and 20 groups' of applicant is equivalent to 'C clusters where C>1' of Banavar.) It would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to modify the combined teachings of Elias, Magnuson, Mehrotra, Katz, Straforini and Vaithyanathan by keeping group size below 20 groups as taught by Banavar to have the step of determining a plurality of partitions comprises applying the hierarchical clustering method to create partitions containing between about 1 and about 20 groups.

For the purpose of balancing the compression versus loss of accuracy

Response to Arguments

5. Applicant's arguments filed on January 11, 2008 for claims 1-25, 31, 33, 37-39, 82-99 have been fully considered but are not persuasive.

6. In reference to the Applicant's argument:

The Examiner further stated that "[r]econfiguring a neural network of applicant is equivalent to 'first principle model (FPM I)' on a 'non-linear model' of Magnuson." Office Action at page 3. The Examiner references Magnuson paragraphs [004], [0035], and [0044]; however none of these cited paragraphs teach or render obvious "reconfiguring a neural network stored in the medical instrument" as stated in Applicant's Claim 1. Rather, Magnuson discloses "that the model can continually be trained with updated data to more fully refine the model and more fully define the stored representation." Magnuson, para. [0040]. "Thus the neural network is trained on this time series of data inputs output by each of the first principles models and also the time series associated with the measurable variables and the external inputs." Magnuson, para. [0046]. Applicant submits that these and other portions of Magnuson do not disclose "reconfiguring a neural network stored in the medical instrument based on at least one training case" as recited in Claim 1 but merely disclose training a neural network using data from a particular human body. Id., para. [0044]. In contrast, Claim 1 recites, "reconfiguring a neural network stored in the medical instrument based on the at least one training case of the particular patient, wherein reconfiguring comprises adding a node indicative of the at least one training case" Desirably, according to one embodiment, a stored neural network can be reconfigured based on a single training case of the particular patient and not the full data set.

Examiner's response:

Mehrotra is used in combination with Elias and Magnuson. Mehrotra discloses the tiling algorithm which is use upon a master unit to insert additional nodes to handle additional classification tasks. The addition of said nodes are equivalent to reconfiguration of the neural network. Office Action stands.

7. In reference to the Applicant's argument:

In discussing similar features of Claim 31, the Examiner takes the position that "' [a]dding a first pattern layer' of applicant is equivalent to inserting one of the 'first pattern model [sic] (FPM i)' of Magnuson." Office Action, at 6. However, Applicant submits that nowhere does Magnuson disclose a first pattern model. See generally, Magnuson. Rather, FPM in Magnuson stands for 'First Principle Model' and not 'First Pattern Model'. Magnuson, para. [0043]. Further, Applicant submits that nowhere does Magnuson disclose reconfiguring a first principle model based on a training case nor does Magnuson disclose adding a first principle model indicative of a training case. Rather, Magnuson discloses embodiments that include multiple models and that a first principle model can be replaced by another model but fails to disclose reconfiguring those models, and in particular, fails to disclose "wherein reconfiguring comprises adding a node indicative of the at least one training case" as recited by Claim 1, as amended. See, e.g., Magnuson, Figures 10 and 14, para. [0044]. Applicant submits that Elias also fails to disclose such features (and the Examiner does not so argue). Accordingly, Applicant submits that Elias and Magnuson, alone or in combination, also fail to teach or render obvious "reconfiguring the network comprises adding a node indicative of the at least one training case" as recited by Claim 1 as amended. As Elias and Magnuson fail to teach or render obvious the features discussed above with reference to Claim 1, as amended, and, hence, Claim 1 is patentable in view of the cited references.

Examiner's response:

'First principle model' is equivalent to the 'first pattern model.' Mehrotra is introduced to illustrate the addition of nodes which reconfigure the neural network by the method of the tiling algorithm. Mehrotra is used in combination with Elias and Magnuson. Office Action stands.

8. In reference to the Applicant's argument:

Similarly, Claim 82 recites "identifying a portion of the signal that is indicative of a medical event of the particular patient based on user input" and "reconfiguring a predictive model stored in a memory of an electronic device for identifying a subsequent medical event of the particular patient based on an additional biomedical signal of the patient, wherein reconfiguring the predictive model comprises adding a

node indicative of the at least one training case." Claim 89 recites a system comprising a processor configured to "reconfigure the stored neural network based on the at least one training case of the particular patient, wherein the processor is configured to reconfigure the neural network by adding a node indicative of the at least one training case." Claim 93 recites a system comprising a processing means configured to "reconfigure the stored neural network based on the at least one training case of the particular patient, wherein reconfiguring the network comprises adding a node indicative of the at least one training case." Claim 99 recites "reconfiguring a neural network stored in the medical instrument based on the at least one training case of the particular patient, wherein the processing means is configured to reconfigure the neural network by adding a node indicative of the at least one training case." Applicant submits that Elias and Magnuson, alone or in combination, also fail to teach or render obvious these features for at least the same reasons discussed with reference to Claim 1. Accordingly, Applicant submits that each of Claims 82, 89, and 99, as amended, are patentable in view of Elias and Magnuson.

b. Discussion of Rejection of Independent Claim 31

On page 3 of the Office Action, the Examiner rejected Claim 31 as being unpatentable over the combination of Elias in view of Magnuson. The Examiner asserts that it "would have been obvious to a person having ordinary skill in the art at the time of Applicant's invention to modify the teachings of Elias by using a weights matrix as taught by Magnuson to reconfiguring the neural network to correctly classify the first training case without retraining the neural network wherein reconfiguring the detection module further comprises adding a first pattern layer node to the neural network based on the first training case." Office Action at 6.

The Examiner states that Elias "does not teach reconfiguring the neural network to correctly classify the first training case without retraining the neural network wherein reconfiguring the detection module further comprises adding a first pattern layer node to the neural network based on the first training case." Office Action at 6. However, the Examiner argues that Magnuson teaches "reconfiguring the neural network to correctly classify the first training case without retraining the neural network wherein reconfiguring the detection module further comprises adding a first pattern layer node on the neural network based on the first training case." Office Action at 6.

Applicant submits that nowhere do Elias or Magnuson, alone or in combination, disclose reconfiguring as recited in Claim 31. In particular, Applicant submits that Magnuson instead merely discloses "that the model can continually be trained with updated data to more fully refine the model and more fully define the stored representation." Magnuson, para. [0040]. The Examiner points to paragraphs [0035] and [0044] of Magnuson as disclosure of "reconfiguring the neural network to correctly classify the first training case without altering the weights in retraining the neural network wherein reconfiguring the detection module further comprises adding a first pattern layer node to the neural network based on the first training case." However, Magnuson discloses training a

network via backward propagation which necessarily include adjusting the weights in the neural network. Magnuson, para.s [0037] and [0042]. Applicant submits that Elias also fails to disclose such features (and the Examiner does not so argue). Thus, nowhere does Elias or Magnuson, alone or in combination, disclose or render obvious training a neural network by "reconfiguring the neural network to correctly classify the first training case without altering the weights in retraining the neural network" as recited in Claim 31. Further, as discussed above with reference to Claim 1, neither Elias nor Magnuson, alone or in combination, disclose or render obvious "adding a first pattern layer node to the neural network based on the first training case" as recited in Claim 31. Accordingly, Applicant submits that Claim 31, as amended, is patentable in view of Elias and Magnuson.

Examiner’s response:

Mehrotra is introduced to illustrate the addition of nodes which reconfigure the neural network by the method of the tiling algorithm. Mehrotra is used in combination with Elias and Magnuson. Office Action stands.

Examination Considerations

9. The claims and only the claims form the metes and bounds of the invention. “Office personnel are to give the claims their broadest reasonable interpretation in light of the supporting disclosure. *In re Morris*, 127 F.3d 1048, 1054-55, 44USPQ2d 1023, 1027-28 (Fed. Cir. 1997). Limitations appearing in the specification but not recited in the claim are not read into the claim. *In re Prater*, 415 F.2d, 1393, 1404-05, 162 USPQ 541, 550-551 (CCPA 1969)” (MPEP p 2100-8, c 2, l 45-48; p 2100-9, c 1, l 1-4). The Examiner has the full latitude to interpret each claim in the broadest reasonable sense.

Examiner will reference prior art using terminology familiar to one of ordinary skill in the art. Such an approach is broad in concept and can be either explicit or implicit in meaning.

10. Examiner's Notes are provided to assist the applicant to better understand the nature of the prior art, application of such prior art and, as appropriate, to further indicate other prior art that maybe applied in other office actions. Such comments are entirely consistent with the intent and sprit of compact prosecution. However, and unless otherwise stated, the Examiner's Notes are not prior art but link to prior art that one of ordinary skill in the art would find inherently appropriate.

11. Examiner's Opinion: Paragraphs 9 and 10 apply. The Examiner has full latitude to interpret each claim in the broadest reasonable sense.

Conclusion

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

13. Claims 1-25, 31, 33, 37-39, 82-99 are rejected.

Correspondence Information

14. Any inquiry concerning this information or related to the subject disclosure should be directed to the Examiner Peter Coughlan, whose telephone number is (571) 272-5990. The Examiner can be reached on Monday through Friday from 7:15 a.m. to 3:45 p.m.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor David Vincent can be reached at (571) 272-3080. Any response to this office action should be mailed to:

Commissioner of Patents and Trademarks,

Washington, D. C. 20231;

Hand delivered to:

Receptionist,

Customer Service Window,

Randolph Building,

401 Dulany Street,

Alexandria, Virginia 22313,

(located on the first floor of the south side of the Randolph Building);

or faxed to:

(571) 272-3150 (for formal communications intended for entry.)

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/P. C./
Examiner, Art Unit 2129
Peter Coughlan
3/31/21008

/Joseph P. Hirl/
Primary Examiner, Art Unit 2129